

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-109606

(43)Date of publication of application : 23.04.1999

(51)Int.CI. G03F 1/08
H01L 21/027
// H01L 21/68

(21)Application number : 09-273183

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(22)Date of filing : 07.10.1997

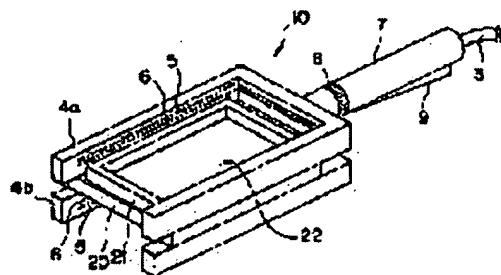
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(54) RETICLE HANDLER

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a reticle handler capable of improving the workability at the time of blow cleaning a reticle, preventing the re-adhesion of dust and the adhesion of the dust during reticle transportation and preventing the fall of the reticle by providing a handler with fixing means having a pair of arms holding and fixing the reticle from above and below.

SOLUTION: The reticle handler 10 has a pair of the pellicle surface arm 4a and glass surface arm 4b as the fixing means for holding the reticle 20, a tube 3 for sending the gas from the outside and screw threads 8 for adjusting the flow rate of the air flow. A pair of the arms 4a, 4b have a U-shape of which both ends are parted from each other. The gas may be passed therein. A lever 9 for fixing the reticle locks the reticle 20 in the state of holding the reticle between the pair of the arms 4a and 4b. The gas is blown out toward the entire surface of the reticle and the entire surface of the pellicle, so that the reticle surface and the pellicle surface may be blow cleaned over the entire part.



LEGAL STATUS

[Date of request for examination]

07.10.1997

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is a photolithography process for manufacturing a semiconductor device, a liquid crystal display component, image sensors (CCD etc.), or a thin film magnetic head, and relates to reticle handlers, such as a blow washing fixture using the gas to the mask and reticle for carrying out imprint exposure on a sensitization substrate, and/or a conveyance fixture.

[0002]

[Description of the Prior Art] At the photolithography process for manufacturing a semiconductor device, a liquid crystal display component, image sensors (CCD etc.), or the thin film magnetic head in recent years, with the frame called a ** RIKURU frame, the mask and reticle for carrying out imprint exposure on a sensitization substrate separate only fixed distance from on a pattern side, and have come to stick the thin film called a pellicle on a pattern side in order to prevent adhesion of dust etc.

[0003] Although it is washing by penetrant removers, such as pure water, when dust etc. adheres to **-RIKURU-less reticle conventionally In the case of reticle with a pellicle, even if dust etc. adheres Since pure water etc. was not able to wash, the screw 52 for reticle immobilization of a grip and a handle 54 was tightened for reticle 20 by each reticle presser foot 51 prepared in the end section of the arm 53 of a fixture 50 like drawing 7 usually first, and reticle 20 was fixed. then, to a position moving -- drawing 8 -- it needs -- a blow gun Or the pressure gas blowdown fixture called an air gun (It is hereafter called a blow gun) 60 the dried air which entered from the tube 61 which used and was prepared in the end of the blow gun body 63, and N2 etc. -- blasting from the air nozzle 62 prepared in the other end of dust ***** discovered by reticle and pellicle surface analysis according pressure gas to a stepper, and the blow gun body 63 -- The approach of blowing away adhering dust is taken. This conventional approach is called blow washing.

[0004]

[Problem(s) to be Solved by the Invention] In the Prior art, when carrying out blow washing of the dust discovered in a stepper's reticle and pellicle surface analysis, dust was found and blown visually. However, since skill of an operator was needed, it was also difficult to work to also find dust visually, since dust is minute, and to remove the dust.

[0005] Moreover, in the Prior art, although powerful gas could be locally sprayed from a blow gun 60 like drawing 8 , since it was not able to blow away to a distant place so that the reattachment of the removed dust is not carried out, the dust removed from reticle and a ** RIKURU side by blow washing was not blown away to the distant place, but might adhere to reticle and a pellicle side again.

[0006] Moreover, since reticle 20 will be in an unreserved condition in case reticle 20 is conveyed using the fixture of drawing 7 , it had the fault of any failure not having suspended particles of dust, they adhering to reticle 20, and making new dust adhere.

[0007] Furthermore, the top where the reticle presser foot 51 is small, since it did not fix by two places, it had the fault that it is dramatically unstable that reticle 20 will fall out in the direction without the reticle presser foot 51 etc. when reticle immobilization is carried out, and workability was bad.

[0008] Then, the technical technical problem of this invention is to offer the reticle handler which can prevent drop of reticle while the reattachment of the dust improved and removed can prevent the workability at the time of carrying out blow washing of the reticle and it can prevent adhesion of the dust under reticle conveyance.

[0009]

[Means for Solving the Problem] According to this invention, in the reticle handler for holding and conveying the reticle which prepared Mika of reticle, or a pellicle, the reticle handler characterized by having the fixed means equipped with the arm of the couple which puts said reticle from the upper and lower sides, and is fixed is obtained.

[0010] Moreover, according to this invention, in said reticle handler, the reticle handler characterized by equipping said arm with the gas instrument of circulation for passing gas in the arm concerned is obtained.

[0011] Moreover, according to this invention, in said reticle handler, said gas instrument of circulation is connected with, and by the gas passing through the inside of said arm, the reticle handler characterized by having an air curtain generation washing means to perform blow washing is obtained at the same time it forms an air curtain around said reticle.

[0012] Moreover, according to this invention, in said reticle handler, the reticle handler characterized by equipping said air

curtain generation washing means with the gas blowdown hole of the 1st sort for said air curtain generation prepared in said arm and the gas blowdown hole of the 2nd sort for [said] carrying out blow washing is obtained.

[0013] Moreover, according to this invention, in said reticle handler, the reticle handler characterized by said gas blowdown hole of the 1st sort having the include angle which can form said air curtain in parallel in the direction of an arm head concerned from the supporter of said arm is obtained.

[0014] Moreover, according to this invention, in said reticle handler, the reticle handler characterized by said gas blowdown hole of the 2nd sort having the include angle of ** RIKURU prepared in said reticle or said reticle which can carry out blow washing of the whole whole surface at least is obtained.

[0015] Moreover, according to this invention, in said one of reticle handlers, further, after putting said reticle, the reticle handler characterized by having a lock device for locking closing motion of said arm is obtained.

[0016] Furthermore, according to this invention, in said one of reticle handlers, the reticle handler characterized by each of the arm of said couple having the shape of a typeface of KO so that it may put on both sides of the reticle which prepared said reticle or said pellicle from the upper and lower sides is obtained.

[0017]

[Embodiment of the Invention] Hereafter, it explains, referring to a drawing about the gestalt of operation of this invention.

[0018] Drawing 1 is the perspective view showing the reticle handler by the gestalt of implementation of this invention. As shown in drawing 1, the reticle handler 10 is equipped with the pellicle side arm of a couple and glass side arm 4b (it is only hereafter called Arms 4a and 4b), the tube 3 for sending the gas from the outside, and the screw 8 for air-current flow control as a handle 7, the lever 9 for reticle immobilization, and a fixed means for putting reticle 20. The couple arms 4a and 4b have the configuration where ends estranged mutually, by the shape of a typeface of KO, and can let gas pass in it. The reticle handler 10 has the lock device equipped with the lever 9 for reticle immobilization which locks reticle 20 in the condition of having put in between with the arms 4a and 4b of a couple.

[0019] The gas pipe 1 (drawing 3 and drawing 4 explain in detail) as a gas instrument of circulation for the arms 4a and 4b of a couple to pass gas in this arm 4a and 4b, The pore 5 (blowdown hole of the 1st sort) for two or more air curtains as an air curtain generation washing means to perform blow washing while blowing off the gas which passed this gas instrument of circulation and forming an air curtain, It has two or more pores 6 (blowdown hole of the 2nd sort) for blow washing which perform blow washing.

[0020] In addition, a sign 21 is a pellicle frame and a sign 22 is the pellicle film prepared in the pellicle frame 21.

[0021] Drawing 2 expands and illustrates a part of arms 4a and 4b of drawing 1 . As shown in drawing 2 , the direction of the train of the pore 6 for blow washing is arranged at two trains, respectively so that the pore 5 for air curtains and the pore 6 for blow washing may approach Arms 4a and 4b rather than the direction of the train of the pore 5 for air curtains on a reticle front face.

[0022] Drawing 3 is a sectional view in the A-A' side of arm 4a of drawing 2 , and drawing 4 is a sectional view in a B-B' side about arm 4a of drawing 2 . In addition, with arm 4a, although not shown in drawing 3 and drawing 4 , up Shimonoseki charge has the same configuration for it, although arm 4b also becomes reverse.

[0023] drawing 1 -- or -- drawing 4 -- being shown -- as -- a tube -- three -- having entered -- gas -- a handle -- seven -- the interior -- a passage -- an arm -- four -- a -- four -- b -- inside -- gas -- an instrument of circulation -- ***** -- a gas pipe -- one -- a passage -- an arm -- four -- a -- four -- b -- a head -- up to -- it can reach -- coming -- **** . From the pore 6 for blow washing and the pore 5 for air curtains which have been arranged at these arms 4a and 4b, the gas by which close came in arm 4a and 4b performs the blowdown and blow washing, and forms an air curtain again.

[0024] The include angle alpha is attached in the direction of an arm head to Arms 4a and 4b, and the pore 5 for air curtains is easy to form an air curtain as well shown in drawing 3 .

[0025] An include angle beta is attached and the pore 6 for blow washing of Arms 4a and 4b is arranged so that it can blow all over a pellicle side and reticle, as well shown in drawing 4 on the other hand. It is necessary to install these include angles alpha and beta at the same include angle to no holes, respectively. Moreover, this reticle handler 10 can be used also as an arm for reticle conveyance in a facility.

[0026] Next, actuation of the gestalt of operation of this invention is explained to a detail with reference to drawing 5 and drawing 6 . Drawing 5 is a sectional view when having put reticle 20, and a sink and the quantity-of-gas-flow stretching screw 8 adjusting a quantity of gas flow for gas, and blowing off gas from the gas tube 3 from Arms 4a and 4b. Drawing 6 is drawing which expanded a part of arm 4a of drawing 5 . In addition, with arm 4a of drawing 6 , although it does not ***** , arm 4b of drawing 5 also has the same configuration, although up Shimonoseki charge becomes reverse.

[0027] If drawing 5 and drawing 6 are referred to, fix reticle 20 to Arms 4a and 4b, and a gas pipe (see drawing 3 and drawing 4) is minded in arm 4a and 4b. The gas by which gas came out from the pore 5 for air curtains attached in Arms 4a and 4b by sending gas from the blowdown and the pore 5 for air curtains Since it blows off in the direction of a head of Arms 4a and 4b, an air curtain 11 is made into parallel on the bottom front face of reticle 20, and the front face of the pellicle film 22. Moreover, since the gas which came out from the pore 6 for blow washing since an include angle was attached and the pore 6 for blow washing was arranged so that it may spray all over the whole reticle surface and ** RIKURU blows off to formation and coincidence of an air curtain 11 toward the front face of reticle 20, and the front face of the pellicle film 22, blow washing of the whole surface of reticle 20 and the whole surface of the pellicle film 22 can be carried out.

[0028] Therefore, the location of the dust adhering to the front face of reticle 20 and the front face of the pellicle film 22 is not pinpointed, but blow washing can be carried out. Moreover, the dust which is distant from the front face of reticle 20 and

the front face of the pellicle film 22 with blow washing rides on the air current of an air curtain 11, and does not carry out the reattachment to the front face of reticle 20, and the front face of the pellicle film 22, but is blown away to a distant place. [0029] Furthermore, by the air curtain 11, since the front face of reticle 20 and the front face of the pellicle film 22 are protected, even if it conveys with the reticle handler 10 by the gestalt of operation of this invention, suspended particles of dust ride on the air current of an air curtain 11, without adhering to the front face of reticle 20, and the front face of the pellicle film 22, and are blown away to a distant place. Moreover, of course, it is not necessary to check the location of dust and to carry out blow washing from a blow gun.

[0030]

[Effect of the Invention] As explained above, since blow washing of a reticle side and the whole ** RIKURU side can be carried out, according to this invention, the reticle handler which can carry out blow washing can be offered by the pore for blow washing which was able to attach the include angle so that gas might be blown off towards the whole reticle surface and the whole pellicle surface on an arm, without pinpointing the part of dust only by the actuation which puts easy reticle.

[0031] Moreover, according to this invention, for the air curtain made by the reticle front face, before dust adheres to a reticle front face, it is blown away by the pore for air curtains prepared in the arm, and the reticle handler which can prevent adhesion of new dust during reticle conveyance or reticle blow washing can be offered by it.

[0032] Moreover, since reticle blow washing and air curtain formation of the reticle circumference can be performed simultaneously according to this invention, since the dust which is distant from a reticle side and a pellicle side by blow washing is blown away to a distant place by the air curtain, it can offer the reticle handler which can prevent the reattachment of the removed dust which carried out reticle blow washing.

[0033] Furthermore, since according to this invention it is fixable so that the arm configuration may carry out the configuration which the head opened with the character type of KO and reticle may be put from the upper and lower sides, reticle can be fixed thoroughly and the reticle handler which can prevent drop of reticle can be offered.

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CLAIMS

[Claim(s)]

[Claim 1] The reticle handler characterized by having the fixed means equipped with the arm of the couple which puts said reticle from the upper and lower sides, and is fixed in the reticle handler for holding and conveying the reticle which prepared Mika or reticle, or a pellicle.

[Claim 2] It is the reticle handler characterized by having the gas instrument of circulation for said arm passing gas in the arm concerned in a reticle handler according to claim 1.

[Claim 3] The reticle handler characterized by having an air curtain generation washing means to perform blow washing by the gas which connected with said gas instrument of circulation, and has passed along the inside of said arm in a reticle handler according to claim 2 at the same time it forms an air curtain around said reticle.

[Claim 4] It is the reticle handler characterized by having the gas blowdown hole of the 1st sort for said air curtain generation to which said air curtain generation washing means was formed in said arm in the reticle handler according to claim 3, and the gas blowdown hole of the 2nd sort for [said] carrying out blow washing.

[Claim 5] It is the reticle handler characterized by having the include angle at which said gas blowdown hole of the 1st sort can form said air curtain in parallel in the direction of an arm head concerned from the supporter of said arm in a reticle handler according to claim 4.

[Claim 6] It is the reticle handler characterized by having the include angle of ** RIKURU by which said gas blowdown hole of the 2nd sort was prepared in said reticle or said reticle in the reticle handler according to claim 4 which can carry out blow washing of the whole whole surface at least.

[Claim 7] The reticle handler characterized by having a lock device for locking closing motion of said arm after putting said reticle between claim 1 thru/or either of 6 further in the reticle handler of a publication.

[Claim 8] It is the reticle handler characterized by having the shape of a typeface of KO so that it may put on both sides of the reticle in which each of the arm of said couple prepared said reticle or said pellicle in claim 1 thru/or the reticle handler given in either of 7 from the upper and lower sides.

[Translation done.]